

IS THERE A DIP IN YOUR FUTURE?

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What I am talking about here is Digital Imaging Platforms or DIPs. These systems allow you to capture images of your infrastructure and display them on a computer. They come in all shapes, sizes and kinds. Some vendors also add tools like laser reflectometers, profilometers and Ground Penetrating Radar (GPR). For this introductory article, I would like to focus our attention on just Ground Based Imaging or GBI.

Ground Based Imaging may sound like a new term, but in principle, it has been around for along time in different forms. I started in GBI in the early eighties; at that time there was a paradigm shift from the old 35mm reel film to 3/4 inch Sony U-Matic, or Beta videotape ushering in the dawn of videotape based systems. In the late eighties there was a shift to Beta or SVHS tape based systems and the nineties saw the transition to a combination of tape and digital imaging systems. No matter what the current technology, format or equipment used, the basic product is the same, a photo image connected to a geographical location

Today in the 2000's the digital image is dominating the scene and for good reason. Unlike it's predecessors these new digital images can be distributed more inexpensively and to a wider audience then ever before. These images are also more versatile then their predecessors. As a digital file you can E-mail them, draw on them, use them in presentations, import them into a GIS or a host of CAD and graphics software packages.

Even the geographical location of these images has improved through time. With the advent of cheap GPS (Global Positioning System), you can now supplement your traditional LRS (Linear Referencing System) or mile posting, with geospatial coordinates from GPS.

In the Northwest there is a system design available to help local agencies apply this technology for themselves, it is called TransView (Transportation View). This system is based on the work accomplished by the Washington State Department of Transportation's, Transportation Data Office (TDO). In the mid nineties, the Transportation Data Office first applied this technology under a project named SR View (State Route View).

Then the WSDOT, Highways and Local Programs, WST2 Center made the results of this successful project available to local agencies. Marion County, OR was the first local agency outside WSDOT to build one for themselves and called it CR View (County Road View). Building on Marion County's success, Thurston County, WA is now in their first year of production with a system of their own. This is a third generation system with improvements on the first two systems.

Rather then rambling on about these systems myself, I have asked Hans Cregg to outline Thurston County's experience in applying this technology. Hans was key in the development of SR View, helped in the development of Marion Counties CRview, and most recently has been instrumental in helping Thurston Counties with their CR View application and systems integration.

CRview-DIP the Thurston County Way!
by Hans Cregg, Thurston County, WA

Thurston County's interest in fielding a mobile imaging platform to gather roadway images dates back to 1995. The county's Roads and Transportation Services Department quickly recognized the advantages of having an annual visual record of all county roads. After all, a picture is worth a thousand words.

However, it wasn't until 1998 that Thurston County bit the bullet and allocated the money and time to build a functioning imaging system. It was Mr. Leslie Olsen, County Surveyor, and Mr. Daniel DeBoer from the Thurston County Survey Office that led to the successful implementation of the county's imaging system, dubbed CRview, in August of 2000.

Since its maiden voyage, the CRview van has filmed 90% of the county's road system providing a picture every 35 feet. When completed, CRview will have digitally captured the 2,200 lane-mile county road system in 330,000 images. The captured images are compressed JPEG files occupying approximately 80K bites of hard drive space per picture. A slideshow viewer displays these pictures at a default setting of 640 X 480 pixels. The pictures have excellent resolution and no jaggies. Road details are crisp and traffic signs are readable.

Currently Thurston County is in the process of uploading the images to a server. The server will afford county employees the convenience of driving the county's roads from their computer. The question what is really out there? can be answered without leaving the office.

What is Thurston County using CRview for?

The capability of accessing roadway images on the computer is only now being fully explored. Any situation where only a picture will do is a potential CRview application.

Today, CRview satisfies the following county needs where a visual record is desirable:

- Standard Road filming.
- Accident Investigation.
- Sign Inventory.
- Right-of-Way encroachment.
- Culverts and Guardrail Inventory.
- Vegetation Management.
- Special Projects such as Rails to Trails.

New applications for CRview are surfacing virtually every day. Currently the county is exploring the possibility of using CRview for Pavement Evaluation and Retro-reflectivity.

How does CRview work?

The CRview van drives the county's roads in both directions. A Distance Measuring Instrument (DMI) superimposes milepost information on the image captured every 35 feet. Since the DMI is nothing more than a fancy odometer, the CRview software is able grab the image the camera sees at the precise moment that the DMI turns over, every 35 feet

CRview software compresses that image, gives it a file name, stores it on the hard drive of the onboard computer, clears its memory and waits to grab the next image 35 feet down the road. The file name given to the image is the actual milepost reading of the DMI. Thus image 10754.jpg corresponds to milepost 10.754 as indicated on the DMI. Traveling at roughly 35 mph, CRview is able to capture and process an image every 0.7 seconds.

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Capabilities:

CRview images provide a sequential visual record of the road just driven.

The CRview platform is also capable of capturing GPS centerline reference points on the fly. However, since Thurston County already had established centerline coordinates for all its roads this feature is currently not used.

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In addition, the CRview imaging platform can also produce regular old-fashioned videotapes on request with road name and milepost information overlaid onto the tape.

Building your own imaging platform:

Admittedly there is something intriguing about following in Thurston County's footsteps and building your own imaging platform. It has been an extremely challenging as well as rewarding journey for Thurston County.

Before embarking on building your own imaging platform make absolutely certain that your management clearly understands that this is not a Plug and Play system. Allow yourself at least a year to get the system up and running. The reason for the seemingly long lead-time is that you are forging the widely diverse technologies of imaging, electronic distance measuring, videography and possibly GPS into an integrated computer controlled system. Suffice it to say there is a lot to learn, but there is also a lot to gain if you are willing to invest the time and money.

Thurston County system costs:

The costs shown below are approximations based on Thurston County's imaging platform. They do not include the van, GPS equipment, and labor associated with building and learning the system.

Basic System costs

Video Camera \$8,000
VCR Deck \$1,000
DMI and Misc. \$3,000
Inverter \$3,500
Laptop \$2,000
Video cards \$1,500
Magnicoder (Overlay) \$3,000
Van modification \$1,500
Computer \$5,000
Total \$28,500

Conclusion:

I am sure this brief overview of the Thurston County experience has raised more questions than it answered. Feel free to contact me, Hans Cregg, at Hcregg@AOL.com if you have any questions regarding the building or operation of a CRview imaging platform or Leslie Olsen and Daniel DeBoer at olsenl@co.thurston.wa.us and deboerd@co.thurston.wa.us respectively if you want to visit Thurston County and see the CRview van for yourself.

A copy of the manual for the original SR View system, is available on the web at:

<http://www.wsdot.wa.gov/ta/T2Center/Mgt.Systems/InfrastructureTechnology/InfThp.html>

Keep in mind that these systems are in a constant state of dynamic evolution, and the original SR View documentation is now two generations old. It useful for a more detailed idea of how these systems work, but you will need to do some research before embarking on a project of your own.

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